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Structural Model Presentation of Psychological Maladjustment Based on Post-Traumatic Stress Symptoms with the Mediating Role of Ego Strength in Individuals with Chronic Pain

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A B S T R A C T

Objective: The present study aimed to present a structural model of psychological maladjustment based on post-traumatic stress symptoms with the mediating role of ego strength in individuals suffering from chronic pain.

Methods: The research method was descriptive, correlational, and structural equation modeling was used. The study population included all patients suffering from chronic pain who had visited specialized pain clinics in Tehran from February 2021 to May 2021. Using the Tabachnick and Fidell (2007) formula, the sample size was determined to be 330, selected through convenience sampling. Research instruments included the Psychological Adjustment Questionnaire (Rohner & Khaleque, 2005), the Mississippi Scale for Post-Traumatic Stress Disorder (1998), and the Psychological Ego Strength Scale (Markstrom et al., 1997). Data analysis was conducted in two parts: descriptive (central and dispersion indices, skewness, and kurtosis) and inferential (structural equation modeling) using SPSS-V23 and LISREL-V8.8 software.

Findings: The results indicated that the model has a good fit. Additionally, the results showed that there is a significant direct and indirect relationship (mediated by ego strength) between post-traumatic stress and psychological maladjustment in individuals with chronic pain. The results suggest that the effect of post-traumatic stress indirectly influences psychological maladjustment positively through ego strength, with a magnitude of 0.81.

Conclusion: Therefore, through individual and group therapy sessions, assistance should be provided to patients with chronic pain suffering from post-traumatic stress disorder symptoms, enabling them to fairly assess their functioning in life, free the individual from potential guilt at the time of the incident, and the lack of positive individual performance. Thus, by increasing ego strength and reducing avoidance behaviors, a lesser degree of psychological maladjustment can be expected in the individual.

Keywords: *Psychological maladjustment, Post-traumatic stress, Ego strength, Chronic pain.*

1. Introduction

Pain causes organisms to avoid hazardous and unpleasant stimuli, thereby playing a crucial role in preserving life. Although the presence of pain is essential for survival, it often loses its warning function. Uncontrollable and chronic pain may cause changes in the central and peripheral nervous systems through neural plasticity and central sensitization, subsequently transforming into a disease itself. Various factors influence the intensity of pain, quality of life, individual response to treatment methods, and the degree of disability, including mood, which can either exacerbate or diminish pain (Goodarzi et al., 2021). According to the World Health Organization, chronic pain is a significant and costly health problem (Andrew et al., 2014), and it is one of the non-lethal diseases that people around the world have lived with for years (Global Burden of Disease Study, 2016). The World Health Organization estimates that chronic diseases are the main cause of death and general disability, accounting for two-thirds of all diseases (Mills et al., 2019). In the United States alone, about 50 million adults suffer from chronic pain (Dahlhamer, 2018). A recent study in China indicated a 30% increase in complaints of pain incidence in its population (Zheng et al., 2020). In Iran, the prevalence of chronic pain in the adult population (ages 18 to 65) ranges from 9% to 14%, and about 67% in the elderly population (ages 60 to 90) (Taghipoor et al., 2013). Over the past decades, significant efforts have been made to better understand, prevent, and treat chronic pain. Based on the biopsychosocial model of disease, individuals with chronic pain often report that pain interferes with their ability to engage in work, social, or recreational activities. Their inability to participate in these reinforcing activities may lead to increased isolation, negative mood (such as feelings of worthlessness and depression), and physical deconditioning, all of which play a role in the experience of pain (Johannsen et al., 2018). Clinical observations and research findings have shown that chronic conditions are a cause of psychological maladjustment in various diseases (Dekker & de Groot, 2018).

Psychological maladjustment is defined as the inability to blend, adapt, compromise, cooperate, and cope with oneself, the environment, and others (Janson et al., 2019). Adaptation means the ongoing adjustment to changes and establishing a connection between oneself and the environment in a way that maximizes self-actualization along with social well-being. Adaptation is the recognition that each individual must pursue their goals within the social and cultural frameworks (Jalili & Mahmoodi, 2021; Janson et al., 2019). Therefore, adaptation can be considered an ability and a tool for coping with changing external and internal conditions (Haj-Yahia & Bargal, 2015). Psychological maladjustment causes the individual to face numerous problems when confronted with various and diverse conditions and prevents them from displaying appropriate actions and behaviors when faced with new situations and conditions, thereby having detrimental and destructive effects on psychological functioning and even the physical state of individuals (Besharat, 2017; Besharat et al., 2018). Adaptation and maladaptation and their various dimensions are fundamental and extensive topics in psychology, and identifying factors related to them can have many applications in reducing individual and interpersonal problems in patients with chronic pain (Koochaki-Ravandi et al., 2015).

One type of disorder that is accompanied by certain behavioral disorders, physical problems, and some psychological maladjustments is post-traumatic stress disorder (PTSD) (Asalgoo et al., 2017). PTSD is often accompanied by chronic pain diseases, including migraines, temporomandibular joint pain, irritable bowel syndrome, fibromyalgia (a chronic musculoskeletal pain syndrome), chronic fatigue syndrome, chronic prostatitis/chronic pelvic pain syndrome, and tension headaches (Afari et al., 2020). This disorder is a public health problem with devastating effects on affected individuals, their families, and society in general (Ravn et al., 2020; Tesarz et al., 2020). Many individuals with chronic pain suffer from PTSD due to incidents that cause trauma-related distress, but chronic pain is also commonly seen as the primary disorder in those affected by PTSD. In assessing the impact of PTSD on pain sensitivity, empirical studies have reported both a decrease and an increase in perceived pain and pain without change in patients with chronic pain, while these mechanisms are not yet fully understood, evidence suggests that different pain characteristics may be related to different PTSD symptoms and coping mechanisms (Tesarz et al., 2020). High levels of PTSD symptoms are associated with increased perceived pain and more symptoms of dissociation in those with reduced pain perception. Additionally, the nature of the traumatic event may play a role in the impact of PTSD on pain sensitivity (Ravn et al., 2020). Regarding the consequences of PTSD, studies have shown that the uncontrolled anger of those affected by this disorder confronts individuals with new dangers and can prevent them from progressing and functioning optimally (Kazemi et al., 2014). The coexistence of chronic pain with PTSD

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creates significant therapeutic challenges (Gilliam et al., 2020).

Since the ego is responsible for managing the psychological system, all psychological problems occur when the ego cannot fulfill its responsibilities. Overall, our ability to cope with life, i.e., our psychological balance, depends on the ego's ability and strength to overcome various pressures imposed on it. Thus, ego strength or the ability of the ego is considered an important variable in human functioning (Koochaki-Ravandi et al., 2015). The concept of ego strength reflects the psychological functioning of individuals in relation to themselves and the environment. Elements that together constitute my overall capability include individuals' ability to tolerate anxiety, the individual's capacity to modulate and channel instinctual pressures and superego demands (Besharat et al., 2018; Siavash et al., 2016). From Freud's perspective (1923), ego strength refers to my ability to face and manage the demands and conflicts of the id, superego, and environmental imperatives. According to Erikson's psychosocial theory (1965), ego strength is the product of overcoming developmental crises and successfully transitioning from one stage to the next in psychosocial development (Besharat, 2017; Besharat et al., 2018). Ego weakness causes the organism to retreat from the external world to the inner world, to withdraw into itself, and to show insufficient and inadequate tolerance and capacity in the face of stress-inducing conditions (Koochaki-Ravandi et al., 2015). Individuals who are strong in ego strength believe that life events and threatening conditions such as suffering from chronic pain can be influenced by effort and believe that any change is a characteristic of the natural flow of life rather than a threat to life security (Jalili & Mahmoodi, 2021). Research findings indicate that psychological adaptation is related to symptoms of post-traumatic stress disorder (Haj-Yahia & Bargal, 2015; Morasco et al., 2013) and ego strength (Besharat, 2017). However, to date, there has been no research in which ego strength has been investigated as a mediator in the relationship between psychological maladjustment and symptoms of post-traumatic stress disorder, therefore the main question of this research is whether the structural model of psychological maladjustment based on post-traumatic stress symptoms, with the mediating role of ego strength in individuals with chronic pain, is appropriately fitted?

2. Methods

2.1. Study design and Participant

This research, considering its objectives, is of the applied type and utilizes quantitative data collection and descriptive analysis through correlation designs and structural equation modeling methods. The study population includes patients with chronic pain who visited specialized pain clinics in Tehran from February 2021 to May 2021. Using purposeful sampling (based on the formula proposed by Tabachnick and Fidell (2007): $N \geq 50+8M$, where N is the sample size and M is the number of independent variables. This study involved 33 independent variables (independent, mediating, and their sub-components, totaling 33 variables)), 314 individuals were selected who visited these clinics during the specified period and were asked to respond to the study's questionnaires. Three individuals were excluded due to not returning the questionnaires, and six were excluded due to incomplete responses, resulting in a final sample size of 305. Inclusion criteria for the sample selection were: a history of chronic pain (pain lasting at least six months, persisting almost daily despite treatments over the last three months), age over 18 years, at least middle school education level, and willingness to participate in the study. Exclusion criteria included unwillingness to participate in the study and non-use of psychotropic drugs.

2.2. Measures

2.2.1. Psychological Adjustment

The Adult version of the PAQ was developed by Rohner and Khaleque (2005) to assess individual psychological adjustment and functionality. It contains 63 items and seven subscales: 1 - Aggression/hostile behavior; 2 - Dependency; 3 - Negative self-esteem; 4 - Emotional instability; 5 - Negative self-efficacy; 6 - Emotional unresponsiveness; and 7 - Negative world view. Responses are rated on a four-point Likert scale from 1 (almost never) to 4 (almost always). The internal consistency of the test was originally reported as $\alpha = .94$, and in this study, it was $\alpha = .97$. The validity of the test in the study by Seydmousavi, Mazzaheri, and Ganbari (2010) using Cronbach's alpha was .82 (Besharat et al., 2018).

2.2.2. Ego Strength

Developed by Markstrom et al. (1997), this questionnaire measures eight points of ego strength, including hope,

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desire, purpose, competence, loyalty, love, care, and wisdom, across 64 questions. Items are rated on a five-point Likert scale ranging from 1 (completely unlike me) to 5 (exactly like me), with inverse items scored in reverse. The highest possible score is 300, and the lowest is 60, where higher scores indicate a higher level of ego strength. The sum of individual item scores determines a person's score. Markstrom and colleagues confirmed the face, content, and construct validity of this questionnaire and reported its reliability using Cronbach's alpha method as .68. Parvizi and colleagues reported a Cronbach's alpha of .64 for the Iranian sample (Besharat et al., 2018).

2.2.3. Post-Traumatic Stress Disorder

Developed by Keane, Caddell, and Taylor (1998), this self-report scale assesses the severity of post-traumatic stress disorder symptoms. It consists of 35 items grouped into five categories: re-experiencing, avoidance, numbing, hyperarousal, and self-harm, rated on a five-point scale (false, true, sometimes true, very true, completely true). The reliability of this test has been estimated between .86 and .94 using Cronbach's alpha method. For concurrent validity, this scale used three tools: the Life Events Checklist, the Post-Traumatic Stress Disorder Checklist, and the Padua Inventory, with correlation coefficients reported respectively as .82, .75, and .23 (Kazemi et al., 2014).

2.3. Data Analysis

The data obtained from the administration of the questionnaires were analyzed using SPSS V23 and Lisrel V7.80 software. Additionally, structural equation modeling was employed to test the research hypotheses.

3. Findings and Results

In this section, the research variables are described using central and dispersion indices.

According to the results obtained, descriptive statistics including mean and standard deviation and the correlation matrix of the research variables are presented in Table 1.

Table 1

Statistical Characteristics of Research Variables

Variable	Component	Mean	Standard Deviation	Skewness	Kurtosis
Psychological Adjustment	Aggression/Hostile Behavior	3.68	0.68	-0.70	-0.09
	Dependency	3.17	0.74	-0.64	0.46
	Negative Self-Respect	3.54	0.81	-0.53	-0.13
	Emotional Instability	3.32	0.93	-0.71	0.28
	Negative Self-Efficacy	3.15	0.79	-0.58	0.39
	Emotional Unresponsiveness	3.39	0.86	-0.73	0.79
	Negative World View	3.45	0.62	-1.19	1.65
Post-Traumatic Stress Disorder	Re-experiencing	3.69	0.76	-0.14	0.36
	Withdrawal	3.42	0.69	-0.24	0.30
	Numbness	3.85	0.83	0.07	0.22
	Hyperarousal	3.22	0.92	0.20	0.04
	Self-Harm	3.38	0.64	0.03	0.42
Ego Strength	Hope	3.28	0.65	0.02	0.27
	Desire	3.38	0.97	-0.23	0.20
	Purpose	3.27	0.61	-0.03	0.30
	Competence	3.24	0.94	-0.31	0.43
	Loyalty	3.35	0.66	-0.02	0.27
	Love	3.49	0.73	0.16	0.33
	Care	3.25	0.89	0.08	0.06
	Wisdom	3.37	0.96	0.19	0.18

Table 1 displays the statistical characteristics of the research variables. Given the skewness and kurtosis values, which are within the range (-1.96, 1.96), the assumption of data normality is strengthened, thus, it can be proposed and accepted that the data are normally distributed. After verifying the normality of the data, the relationship (correlation) between the research variables was evaluated. Therefore, a correlation test was used and its results are reported in Table 2.

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Table 2

Correlation Test

		Psychological Maladjustment	Post-Traumatic Stress Disorder	Ego Strength
Psychological Maladjustment	Correlation	1		
	Sig.	-		
Post-Traumatic Stress Disorder	Correlation	0.611**	1	
	Sig.	0.000		
Ego Strength	Correlation	-0.637**	-0.684**	
	Sig.	0.000	0.000	

**p<0.01

As indicated by the matrix in Table 2, the double asterisk (**) denotes the presence of a statistically significant correlation between the research variables at the 0.01 level. To examine the relationships of the hypothesized variables of the research, a confirmatory structural equation modeling is used. For this purpose, after constructing the structure, adding model constraints, and selecting the maximum likelihood method, the model was implemented, and the path diagrams from Figure 1 and Figure 2 were obtained.

Table 3 presents the most important and common fit indices.

Table 3

Selection of Important Model Fit Indices

Index Type	Index Name	Abbreviation	Value	Acceptable Fit
Absolute Fit Indices	Chi-Square Coverage	-	385.77	-
	Goodness of Fit Index	GFI	0.89	> 0.8
Incremental Fit Indices	Adjusted Goodness of Fit Index	AGFI	0.86	> 0.8
	Comparative Fit Index	CFI	0.97	> 0.9
Parsimonious Fit Indices	Root Mean Square Error of Approximation	RMSEA	0.066	< 0.1

As seen in Table 3, all indices have adequate statistical adequacy, allowing us to confidently ascertain that the researcher has achieved a relatively complete fit regarding these indices.

In Table 4, path coefficients along with t-values for the hypothesis above are provided. As evident, the paths under test are accepted.

Table 4

Path Coefficients and t-values

Path	Path Coefficient	t-value	Significance Level (p)	Status
Post-Traumatic Stress --> Ego Strength	-0.79	-15.60	p < 0.01	Accepted
Ego Strength --> Psychological Maladjustment	-0.33	-6.09	p < 0.01	Accepted
Post-Traumatic Stress --> Psychological Maladjustment	0.55	12.09	p < 0.01	Accepted

Table 5

Direct, Indirect and Total Effects

Independent Variable	Dependent Variable	Direct Effect	Indirect Effect	Total Effect
Post-Traumatic Stress	Ego Strength	-0.79	---	-0.79
Ego Strength	Psychological Maladjustment	-0.33	---	-0.33
Post-Traumatic Stress	Psychological Maladjustment	0.55	0.26 = -0.33 * -0.79	0.81

Therefore, it can be concluded that there is a significant direct and indirect relationship (mediated by ego strength) between post-traumatic stress and psychological maladjustment in individuals with chronic pain. To examine

the extent of direct and indirect effects of independent variables on the dependent variable, it is necessary to present the total, direct, and indirect effects for the endogenous variable of the model, which are visible in Table 5.

As seen in Table 5, the indirect effect of post-traumatic stress on psychological maladjustment through ego strength is 0.81.

Figure 1

Model with T-Values

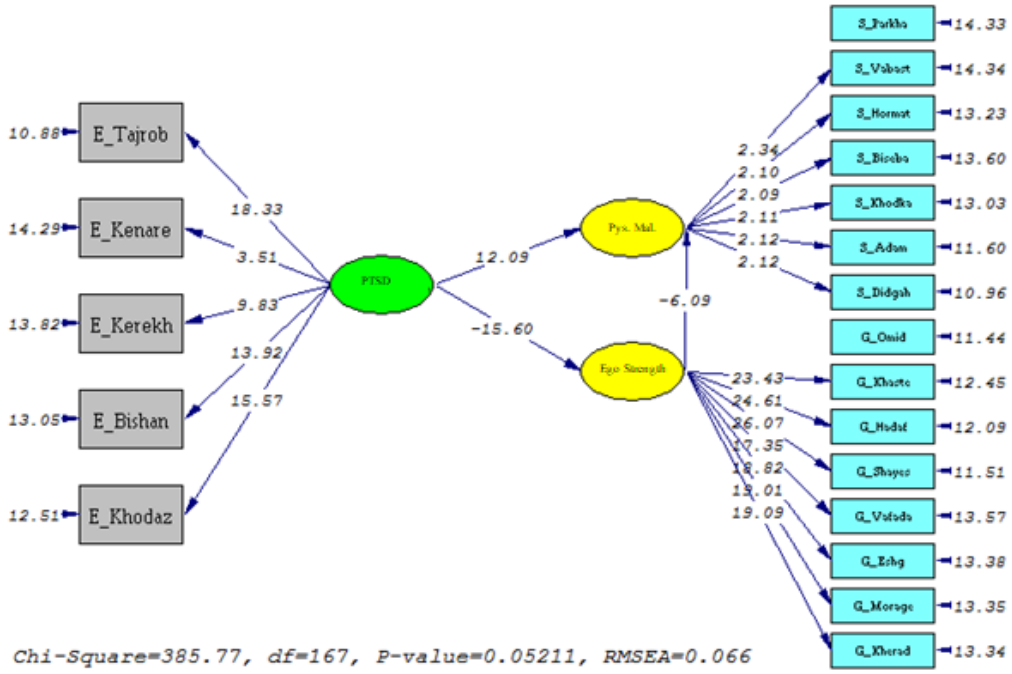
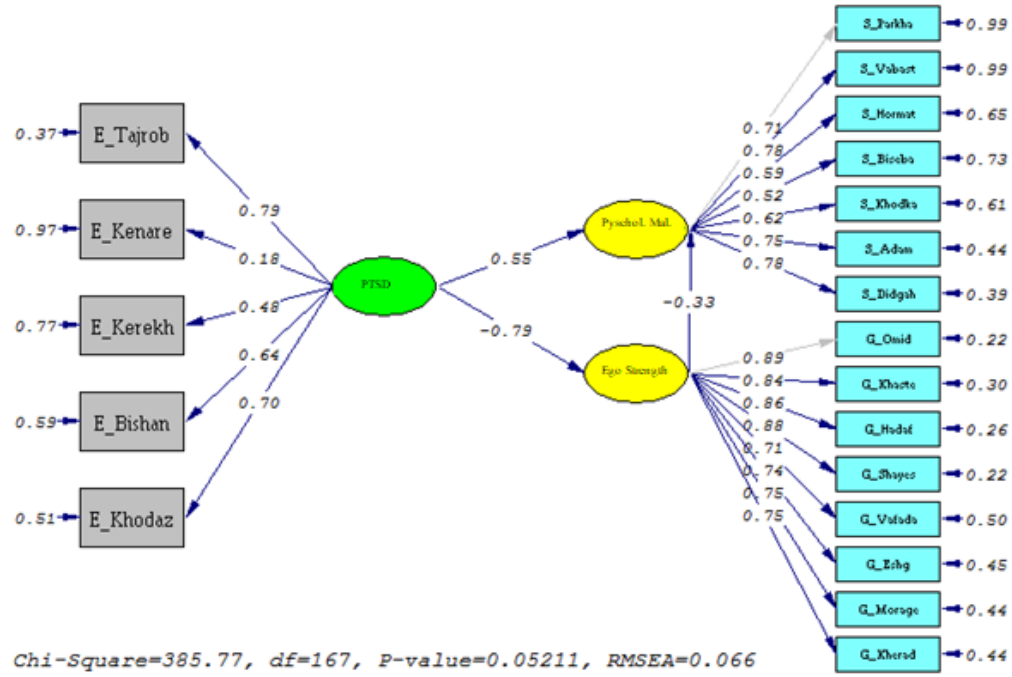


Figure 2

Model with Beta Values



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4. Discussion and Conclusion

The present study aimed to provide a structural model of psychological maladjustment based on symptoms of post-traumatic stress with the mediating role of ego strength in individuals suffering from chronic pain. The results of the statistical analysis demonstrated that there is a significant direct and indirect relationship (mediated by ego strength) between post-traumatic stress and psychological maladjustment in individuals with chronic pain. The findings indicated that the effect of post-traumatic stress indirectly influences psychological maladjustment positively through ego strength, with a magnitude of 0.81. These findings are consistent with the results of prior studies (Haj-Yahia & Bargal, 2015; Morasco et al., 2013) on the relationship between maladjustment and PTSD, the findings (Besharat, 2017; Besharat et al., 2018) regarding maladjustment and ego strength, and (Eddington et al., 2017) on PTSD and ego strength.

In explaining the relationship between psychological maladjustment and post-traumatic stress disorder, it can be stated that when individuals are exposed to distressing and harmful experiences and events, maladaptive and ineffective assumptions about themselves, others, and the world around them are formed (Gilliam et al., 2020). Post-traumatic stress disorder is associated with self-criticism, irritable behaviors, and outbursts of anger (expressed as verbal or physical aggression), self-destructive or reckless behavior, negative changes in cognition and mood related to the event, continuous avoidance of event-related stimuli, and specific physiological responses to internal or external reminders of the event, and displays symptoms of psychological distress and maladjustment (Taghipoor et al., 2013; Tesarz et al., 2020). In explaining the relationship between psychological maladjustment and post-traumatic stress disorder with the mediating role of ego strength, it can be said that the level of ego strength is determined by an individual's set of psychological capabilities for resolving inner psychological conflicts and interacting with the environment, including ego control, resilience, defense mechanisms, and coping strategies (Besharat, 2017). Each of these features helps the individual to deal with problems, engage in problem-solving, maintain their sense of integrity, and achieve a higher level of growth. Thus, the primary function of ego strength is to provide internal psychological and personal capabilities for an individual to cope with stresses and environmental demands and to adapt to them (Kim & Park, 2016). It is likely that an individual suffering from post-traumatic stress disorder, due to the inefficient and repetitive review of images and thoughts associated with the traumatic event, has lower ego strength, and if chronic pain is considered as a stress factor, a deficiency in ego strength can be associated with disproportionate levels of ego control, resilience, and consequently, the use of less effective coping strategies and underdeveloped defense mechanisms in patients with chronic pain, leading to greater psychological maladjustment.

In interpreting other findings, it can be said that ego strength allows an individual, through understanding their capabilities, to organize their thoughts and emotions and identify and select the most appropriate activities to achieve desired outcomes, thus playing a key role in behavioral self-regulation and, consequently, psychological adaptation (Aftab & Shams, 2020). Adaptation is a more or less conscious process based on which an individual aligns themselves with social, cultural, and natural environments. This adaptation requires the individual to change themselves or to make changes in the environment to establish the necessary harmony between the individual and the environment (Rudenko et al., 2015). Ego strength refers to a blend of internal psychological capabilities that individuals demonstrate in their interactions with others and their social environment. According to Freud (1923), ego strength refers to my ability to manage the demands of the id, superego, and environmental requirements and to handle these situations. From this perspective, ego strength helps an individual maintain emotional stability in stressful and overwhelming conditions (Koochaki-Ravandi et al., 2015; Siavash et al., 2016). Conversely, if the ego is not sufficiently robust, the individual struggles with conflicts and experiences emotional turmoil, which affects their adaptability. Ego strength enables the ego to effectively adapt to realities. As a result, ego strength is a variable that can predict adaptation because it includes the effects of the ego in activities that require adaptation based on environmental demands. Higher ego strength is associated with greater adaptation to life's challenges, a willingness to overcome these challenges, and responsibility in various matters. Individuals with higher levels of ego strength have a greater ability to adapt because they can accept differences in others. This issue is manifested as sensitivity to others, empathy with their problems, and the ability to adopt a neutral stance toward conflicts, such that the individual does not involve themselves in environmental conflicts. However, individuals with weak ego strength are generally restless, nervous,

impulsive, and have limited inhibition and low self-control, and cannot endure delay in satisfying their needs. These individuals are reserved and cautious in personal relationships, and by showing inappropriate affection and displaying repetitive behaviors, they create maladjustment in relationships, resulting in low adaptability (Kim & Park, 2016; Koochaki-Ravandi et al., 2015).

Overall, the results of can be explained in such a way that any change in life affects individuals differently and brings a unique flurry of intense thoughts, feelings, and doubts. Suffering from chronic pain interferes with an individual's ability to participate in occupational, social, or recreational activities. The inability of individuals with chronic pain to participate in these reinforcing activities may lead to increased isolation, negative mood (such as feelings of worthlessness and depression), and physical deconditioning, all of which play a role in the experience of pain. Clinical observations and research findings show that chronic conditions are a cause of psychological maladjustment in various diseases. Also, research evidence indicates that different pain characteristics may be related to different PTSD symptoms and coping mechanisms. High levels of PTSD symptoms are associated with increased perceived pain and more symptoms of dissociation in those with reduced pain perception. Additionally, the nature of the traumatic event may play a role in the impact of PTSD on pain sensitivity.

5. Suggestions and Limitations

This study was conducted in Tehran, and in generalizing its results to other conditions, attention must be paid to situational similarities and cultural differences. Since the study population was a small part of the community, composed of patients with chronic pain visiting specialized pain clinics in Tehran during a specific and limited period, the generalization of the findings to other individuals in the community should be considered with caution due to the limited and specific nature of the sample. It is recommended to use trainings that have proven effective in studies to reduce the negative effects of post-traumatic stress disorder on individual functioning, as long as symptoms of post-traumatic stress disorder are observed in patients with chronic pain, these individuals face their conditions with negative biases and cognitive disorders, which result in exacerbated psychological maladjustments in them. Additionally, through individual and group therapy sessions, assistance should be provided to patients with chronic pain suffering from post-traumatic stress disorder symptoms, enabling them to fairly assess their functioning in life, free the individual from potential guilt at the time of the incident, and the lack of positive individual performance. In this way, by increasing ego strength and reducing avoidance behaviors, a lesser degree of psychological maladjustment can be expected in the individual.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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